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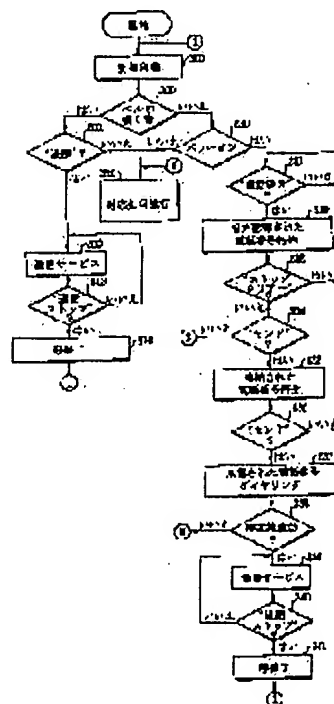
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(54) SPEECH RECOGNITION OPERATION METHOD AND SYSTEM FOR PORTABLE TELEPHONE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a speech recognition operation method for portable telephone and its system by which incoming speech and outgoing speech are possible by dialing the portable telephone by a speech instruction word.

SOLUTION: A speech recognition technology is utilized to allow the portable telephone to recognize simple instruction words and entered keys such as a telephone number for the operation of the portable telephone in speech and to enter the telephone number, the portable telephone has a function of executing incoming and outgoing calls and interruption of the incoming call and the outgoing call and deletes a telephone number that is mis-recognized or the like by a speech instruction word, the presence of operation of a speech recognition processor is selectively decided to reduce power consumption depending on the type of the consumed power supply in use. Adding the voice processor and in interface circuit provided with a simple logical arithmetic operation to a



conventional portable telephone system can attain control in voice without circuit revision, so as to enhance the convenience of operation during driving or the like and this system is applicable to a telephone set for a general home or a public telephone.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] About a cellular phone, the dialing especially of this invention is carried out with voice instruction word, and it relates to the speech recognition operating instructions of the cellular phone which can arrival-of-the-mail-talk over the telephone and dispatch talk over the telephone, and its system.

[0002]

[Description of the Prior Art] When it is going to telephone from the condition that the power source is turned on in the case of a common cellular phone and the common telephone for vehicles, after opening the covering switch of a cellular phone, or raising the headset of the telephone for vehicles and changing into a dispatch standby condition, by all pushing the telephone number of the partner who is going to talk over the telephone, and pushing the Sendo (SEND) carbon button, dialing is carried out and a message is possible. Moreover, also when it is going to appear in the telephone got in the state of reception standby, a message is possible by opening a covering switch or pushing the Sendo carbon button. Moreover, when a mistake is made in inputting the number which it is going to telephone, a clearance (CLEAR) carbon button must be pushed and this telephone number inputted accidentally must be deleted.

[0003] Thus, the actuation method which pushes a carbon button has a user inconvenient to actuation of the operation middle class, opening a covering switch or checking an input carbon button one by one using a hand and an eye. Similarly, when other activities are being done by the hand, or in being a user with trouble in an eye and a hand, considerable inconvenience is to use a cellular phone.

[0004]

[Problem(s) to be Solved by the Invention] Therefore, this invention is thought out in order to solve the above troubles. And it can wear and call clear-down of the dispatch can be carried out. a speech recognition technique -- using -- input key values, such as a figure of the simple instruction word for actuation of a cellular phone, and the telephone number, -- voice -- recognizing -- the telephone number concerned -- dialing -- carrying out -- wearing -- the call message of dispatch -- The related section signature distinguished by the extension number of the identifier which ordinary users tend to memorize, or mutual or a large number, Each area name and the name of a country which are distinguished by many area numbers are registered with voice. By making the library-name concerned correspond and registering the telephone number, the extension number, area number, and country code (the connection number of the international call according to communication link entrepreneur being included) applicable to each into it It sets it as the purpose to offer the speech recognition operating instructions and the system of a cellular phone which can carry out an abbreviated dialing function by the speech recognition to an alphabetic character and a figure.

[0005] It is in other purposes of this invention offering the speech recognition operating instructions and the system of a cellular phone which can reduce power consumption as can be made to delete the telephone number by which the mistake was made in saying and error recognition was carried out with a

voice instruction and determine the actuation existence of a speech recognition processor alternatively according to the class of consumption power source to be used.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the speech recognition operating instructions of the cellular phone of this invention according to claim 1 (a) in the state of (b) dispatch standby in the state of reception standby with the phase converted into a dispatch standby condition when speech recognition of the power-on instruction word is carried out, and the phase converted into a condition during a message when speech recognition of the message instruction word is carried out while the bell rang and the sound has been sensed When speech recognition of the telephone number and the Sendo instruction word by which a continuation input is carried out into fixed time amount is carried out, the phase which carries out the dialing of this telephone number, and is converted into a condition during a message, and during the (c) message in the condition When message stop instruction word has been recognized, it is characterized by including the phase which closes a message and is converted into a reception standby condition.

[0007] the speech recognition operating instructions of the cellular phone of this invention according to claim 2 -- the configuration of claim 1 -- in addition, it is the aforementioned (b) phase, and when speech recognition of the stop clear instruction word is carried out, it is characterized by including the phase again converted into a dispatch standby condition.

[0008] The speech recognition operating instructions of the cellular phone of this invention according to claim 3 In the configuration of claim 1, in addition, the aforementioned (b) phase The phase which carries out speech recognition of the whole telephone number, stores, and reproduces and outputs the this stored telephone number, The phase which judges that the error occurred in the inputted telephone number, deletes the stored whole telephone number and is again converted into a dispatch standby condition when stop clear instruction word has been recognized, after carrying out a playback output, After carrying out a playback output, when the Sendo instruction word has been recognized, it is characterized by including the phase which carries out dialing to the stored telephone number.

[0009] the speech recognition operating instructions of the cellular phone of this invention according to claim 4 -- the configuration of claim 1 -- in addition, when using the consumption power source of the speech recognition processor which carries out the above (a) thru/or the (c) phase by the internal electrical power source, it is characterized by controlling ON/OFF of said speech recognition processor according to the output signal of ON / off switch of voice dialing.

[0010] the speech recognition operating instructions of the cellular phone of this invention according to claim 5 -- the configuration of claim 1 -- in addition, when using the consumption power source of the speech recognition processor which carries out the above (a) thru/or the (c) phase by the external power of a hand free socket, it is characterized by said speech recognition processor driving continuously by the external power concerned.

[0011] the speech recognition operating instructions of the cellular phone of this invention according to claim 6 -- the configuration of claim 1 -- in addition, the criteria voice pattern stored in the speech recognition processor which carries out the above (a) thru/or the (c) phase is characterized by carrying out input receptacle ***** of voice instruction word, the figure of the telephone number, and a notation concerned with a user individual's voice.

[0012] the speech recognition operating instructions of the cellular phone of this invention according to claim 7 -- the configuration of claim 1 -- in addition, the criteria voice pattern stored in the speech recognition processor which carries out the above (a) thru/or the (c) phase is characterized by being the voice instruction word and the figure concerned, and notation which were gained by many people's average pronunciation.

[0013] The speech recognition operating instructions of the cellular phone of this invention according to claim 8 In the configuration of claim 1, in addition, the aforementioned (b) phase When speech recognition of the alphabetic character and the Sendo instruction word by which a continuation input is carried out within fixed time amount in the state of dispatch standby with the specific alphabetic character specified in advance for the abbreviated dialing function is carried out, It is characterized by

including further the phase which carries out the compaction dialing of the telephone number searched by searching the telephone number corresponding to the recognized alphabetic character concerned automatically, and is converted into a condition during a message.

[0014] the speech recognition operating instructions of the cellular phone of this invention according to claim 9 -- the configuration of claim 8 -- in addition, in said dispatch standby condition, the alphabetic character which can be recognized is characterized by including a subscriber name, a trade name name, a domestic and foreign area name, and a related section signature.

[0015] the speech recognition operating instructions of the cellular phone of this invention according to claim 10 -- the configuration of claim 9 -- in addition, the compaction dialing phase in said dispatch standby condition is characterized by carrying out dialing including the country code classified according to the connection number of the international call classified according to the communication link entrepreneur, and each country, a domestic and foreign area number, and a subscriber's telephone number.

[0016] The voice recognition system of the cellular phone of this invention according to claim 11 The speech recognition processor which recognizes the voice which measured the similarity of the input configuration which extracted and gained the feature parameter from the inputted voice instruction word and the sound signal containing the telephone number, and the existing-set-up reference pattern, and was inputted, Said speech recognition processor, the hand-set key input section, The interface section which combines logically the output-signal value of said hand-set key input section which has the same function as the signal value recognized by said speech recognition processor, connecting with a covering switch, and the output-signal value of said covering switch, That is, it connects with said speech recognition processor, the hand-set key input section, and a covering switch. The interface section which matches logically the output signal value of said covering switch or the hand-set key input section with the correspondence signal value recognized by the speech recognition processor, It is a thing smoothly with the description about the control section which controls general actuation of the cellular phone relevant to storing of the telephone number which was offered from said interface section, and which combined and has been recognized according to a signal and deletion, the dialing of the telephone number concerned, message initiation, and message termination being included.

[0017] the voice recognition system of the cellular phone of this invention according to claim 12 -- the configuration of claim 11 -- in addition, it is characterized by driving said speech recognition processor by ON / off actuation of a selecting switch, alternatively in response to the fact that offer of an internal dc-battery power source.

[0018] the voice recognition system of the cellular phone of this invention according to claim 13 -- the configuration of claim 11 -- in addition, said speech recognition processor is characterized by driving in response to supply of power by the external power which is turned on through a hand free socket.

[0019] the voice recognition system of the cellular phone of this invention according to claim 14 -- the configuration of claim 11 -- in addition, said speech recognition processor is characterized by providing the memory which stored the reference pattern by which input receptacle ***** was carried out in voice instruction word and the telephone number concerned with a user individual's voice.

[0020] the voice recognition system of the cellular phone of this invention according to claim 15 -- the configuration of claim 11 -- in addition, said speech recognition processor is characterized by providing the memory which stored the reference pattern generated with the voice instruction word concerned to which it gained from many people's average pronunciation, and the telephone number. That is, in this voice recognition system, based on the voice instruction word uttered by two or more persons beforehand and the sound signal of the telephone number, average pronunciation was analyzed and the reference pattern is gained from that average pronunciation.

[0021] the voice recognition system of the cellular phone of this invention according to claim 16 -- the configuration of claim 11 -- in addition, said speech recognition processor is characterized by measuring the similarity of the input configuration which extracted and gained the feature parameter from the sound signal containing the alphabetic character and the telephone number which were registered into voice instruction word and beforehand, and the reference pattern set as beforehand, and recognizing

voice.

[0022] the voice recognition system of the cellular phone of this invention according to claim 17 -- the configuration of claim 16 -- in addition, said speech recognition processor is characterized by providing a means to sense the connection condition of an external power / internal dc-battery power source, respectively, and operating, only where an external power is connected. That is, with this voice recognition system, only where an external power is connected, a speech recognition processor drives.

[0023] the voice recognition system of the cellular phone of this invention according to claim 18 -- the configuration of claim 16 -- in addition, said speech recognition processor is a thing smoothly with the description about it being installed in the exterior of telephone through the interface means extended with a hand free socket, connecting with said control section, and driving in response to supply of power by the external power.

[0024] The voice recognition system of the cellular phone of this invention according to claim 19 The hand free socket which builds in the speech recognition processor which recognizes the voice instruction word inputted through the microphone, and the telephone number, Two-way communication is connected and carried out by said hand free socket, and a cable/wireless, and the voice instruction word and the telephone number which have been recognized by said speech recognition processor are responded to offer receptacle ***** instruction word. Telephone number dialing, It is characterized by consisting of hand sets which carry out the actuation concerned relevant to message initiation and message termination.

[0025] the voice recognition system of the cellular phone of this invention according to claim 20 -- the configuration of claim 19 -- in addition, said speech recognition processor is characterized by providing the memory which stored the reference pattern generated in response to the input of the voice instruction word and the telephone number concerned with a user individual's voice.

[0026] the voice recognition system of the cellular phone of this invention according to claim 21 -- the configuration of claim 19 -- in addition, said speech recognition processor is characterized by providing the memory which stored the reference pattern generated with the voice instruction word concerned to which it gained from many people's average pronunciation, and the telephone number.

[0027] The voice recognition system of the cellular phone of this invention according to claim 22 In the configuration of claim 19, in addition, said speech recognition processor A subscriber name, a mutual name and a domestic and foreign area name, and a related section signature are registered in advance. It is characterized by including a memory means to make the country code classified according to the connection number of the international call classified into the alphabetic character registered into beforehand [said] according to the communication link entrepreneur, and each country, a domestic and foreign area number, and a subscriber's telephone number correspond, respectively, and to store them.

[0028]

[Embodiment of the Invention] It explains to a detail more with the drawing which attached the gestalt of desirable operation of this invention hereafter.

[0029] The conventional cellular phone is dividing roughly and being constituted by the transmitting section, a receive section, the logic section, the antenna section, the display section, and the power supply section, and this invention's equipping the conventional cellular-phone system with a speech recognition processor by addition, not having modification of the conventional system, either, and operating various kinds of actuation by speech recognition.

[0030] Drawing 1 is a drawing in which the system configuration of the cellular phone of this invention is shown.

[0031] The control section 100 is connected with the receiving signal-processing section 110, the sending-signal processing section 120, the current supply section 130, the memory section 140, and the interface section 180, and controls general actuation of a cellular phone.

[0032] The receiving signal-processing section 110 is controlled by the control section 100, receives a radio signal and recovers from an antenna (not shown). The signal to which it restored is outputted with a sound signal through an earphone 111. The sending-signal processing section 120 is controlled by the control section 100, modulates the sound signal which enters from a telephone transmitter 121 to a radio

signal, and sends it out through an antenna.

[0033] The current supply section 130 can be supplied from the internal dc-battery power source of a hand set, or the external power of a hand free socket, and supplies a power source to each part according to control of a control section 100. The memory section 140 is constituted with non-volatile/volatile memory which stores temporarily various kinds of data generated by storing the main processing program of a control section 100, and processing the main processing program.

[0034] The interface section 180 is connected with the speech recognition processor 150, the hand-set key input section 160, and the covering switch 170, combines logically the output signal of said speech recognition processor 150, the hand-set key input section 160, and the covering switch 170, matches it, and offers it to a control section 100. Logical correspondence relation is made to carry out actuation with the same offer carrier beam control section for the output signal concerned, when the carbon button concerned is pushed for the output-signal value of said hand-set key input section which has the same function as the signal value recognized by said speech recognition processor, or the output-signal value of said covering switch an OR or by carrying out an AND operation and providing to a control section or instruction word and a figure concerned are pronounced. Thus, the interface section 180 matches and manages the signal value recognized by the hand-set key input section 160, or actuation of the covering switch 170 and a speech recognition processor, and by offering the signal value concerned to a control section according to these actuation, also when based on a sound signal, and also when based on button grabbing or covering switch actuation, the same function can be carried out in any case.

[0035] The speech recognition processor 150 recognizes the sound signal (example; voice instruction word (power-on, a stop clearance, Sendo, a message, a message stop, compaction key), a prior registration alphabetic character, voice hand-set key value (a figure, notation)) concerned using the conventional voice-recognition algorithm which extracts a feature parameter for the sound signal inputted from the telephone transmitter 121 from a time domain or a frequency domain.

[0036] The speech recognition processor 150 can also be embodied by software in fact, and can also be embodied in hardware. Although it omits the illustration in embodying in hardware The 1st memory in which the speech recognition processor 150 stores the reference pattern (voice instruction word, a registration alphabetic character, hand-set key value), Extract the various audio parameters inputted through a telephone transmitter 121, and an input configuration is made. The processing section which recognizes the voice which measured the similarity of this input configuration and the reference pattern which it presetted, and was inputted (a kind of pattern matching), The 3rd memory which stores the extension number used by the telephone number of the 2nd memory which stores temporarily the voice recognized in the processing section, and the subscriber corresponding to said registration alphabetic character and each alphabetic character, the area number, and Qi Hong, the connection number of the international call according to communication link operator, and a country code is provided.

[0037] On the other hand, in the gestalt of desirable operation; construction of a reference pattern can build a database with a speaker subordination method (specified speaker method) and the speaker stand-alone mode (unspecified speaker method). Although voice instruction word, a prior registration alphabetic character, the figure of the telephone number, Sharp (#), a star (*), etc. are pronounced and it is made to register directly with a user's own voice of a cellular phone in the case of a speaker subordination method, when the reference pattern of individual voice is stored in the same memory as EEPROM, and is placed in this way and it uses a cellular phone, the accuracy of speech recognition becomes and is effective for 90% or more. In the case of the speaker stand-alone mode, average patterns, such as the voice instruction word and the registered alphabetic character which were extracted from many people; a figure of the telephone number, Sharp (#), and a star (*), can be made to be able to store in memory beforehand, and a cellular phone can be manufactured.

[0038] The current supply of the speech recognition processor 150 can be provided with the power of the current supply section 130 through an interface 180 by control of a control section 100, as mentioned above.

[0039] On the other hand, in the gestalt of other operations, the speech recognition processor 150 can be driven, directly in response to the fact that offer of an internal dc-battery power source or an external

power. It possesses a means to sense the connection condition of an external power or an internal dc-battery power source, respectively, and when using an internal dc-battery power source, said speech recognition processor equips with the selecting switch for voice dialing, and it enables it it not only can to operate, but [only where an external power is connected,] to be able to connect the internal dc-battery power source of a hand set, or to intercept it. This is effective in reducing the power consumption by the speech recognition processor to the maximum extent for dc-battery use of the vigor of the formation of small lightweight of a cellular phone, and long duration.

[0040] Moreover, when using the external power of a vehicle dc-battery etc., while a hand set is inserted by the hand free socket, power is supplied to a speech recognition processor and it is made to drive unconditionally. Thereby, while the external power is supplied, a power source is continuously supplied to a speech recognition processor, and a drive condition is maintained. This can raise a user's convenience by making it power of an external power to be not only enough, but mainly drive according to ON/OFF control of a speech recognition switch, when an external power is used, it is made to drive immediately and an external power is removed, even if it did not turn ON a speech recognition selecting switch during driving of a vehicle, since the speech recognition dial function was the need.

[0041] First, with reference to drawing 2 and drawing 3 , the gestalt of 1 operation of the operating instructions of the cellular phone by speech recognition is explained.

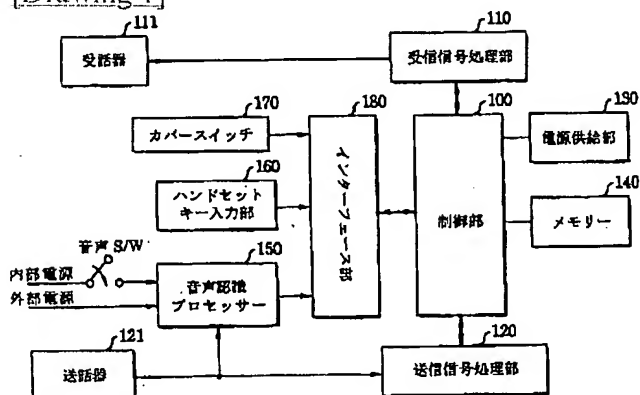
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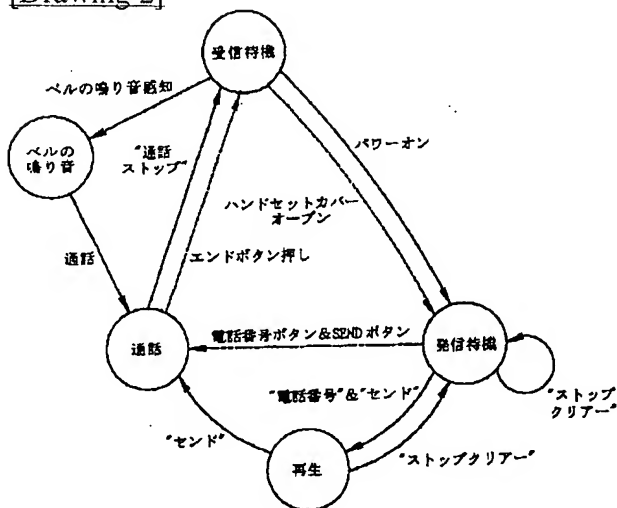
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DRAWINGS

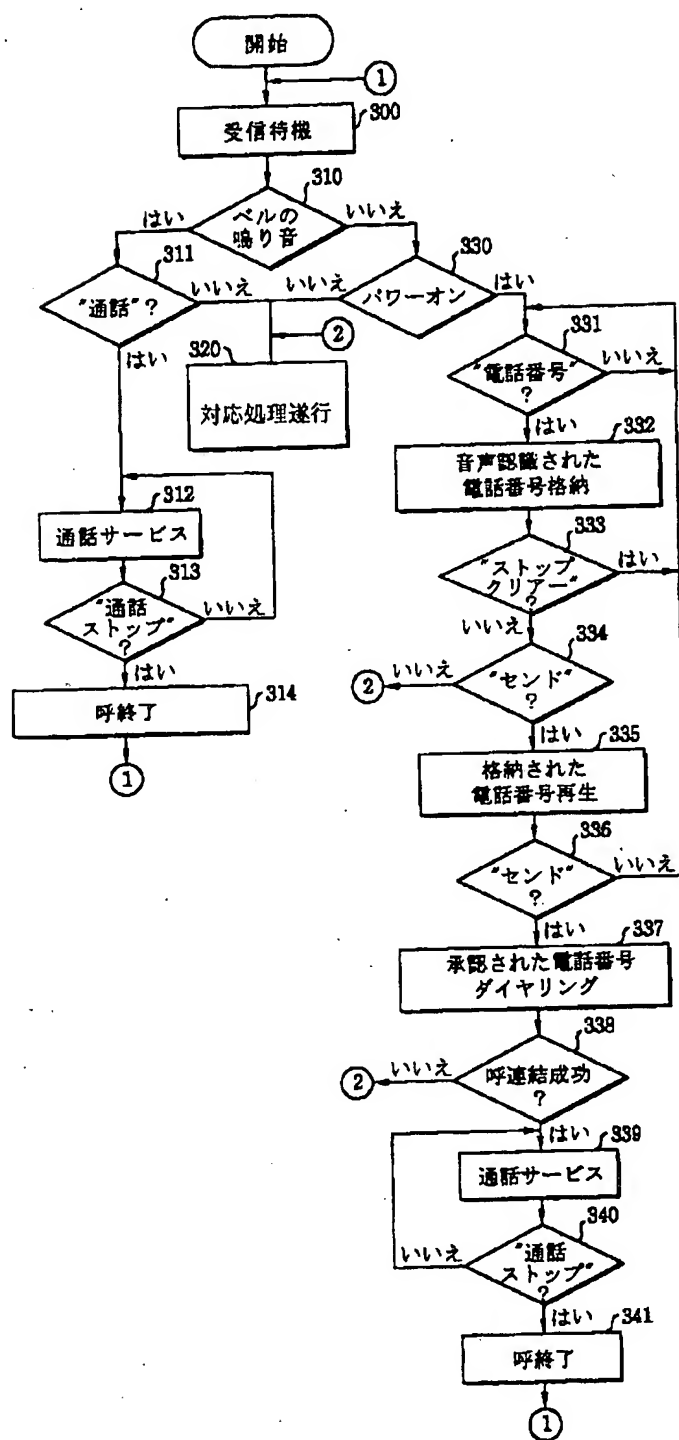
[Drawing 1]



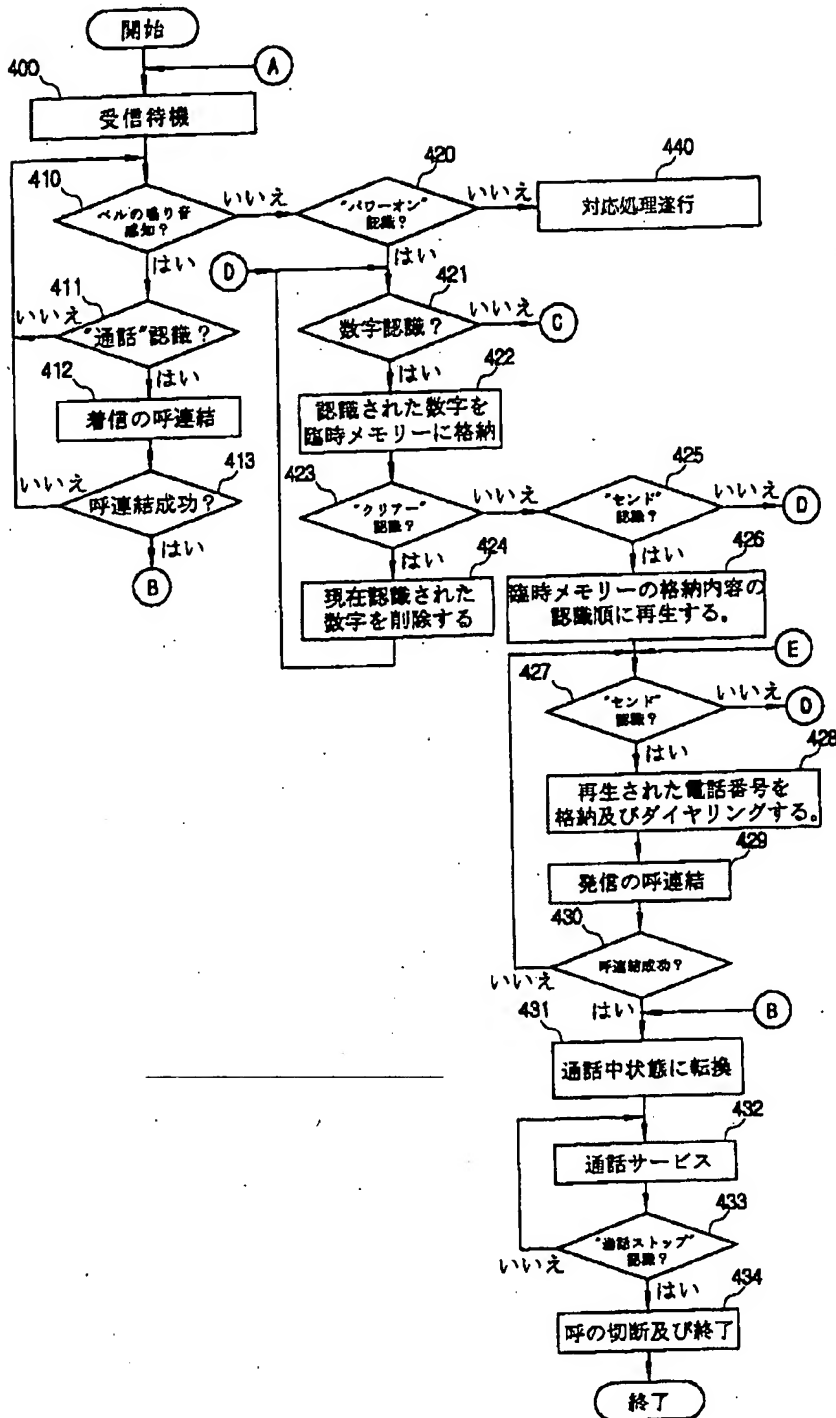
[Drawing 2]



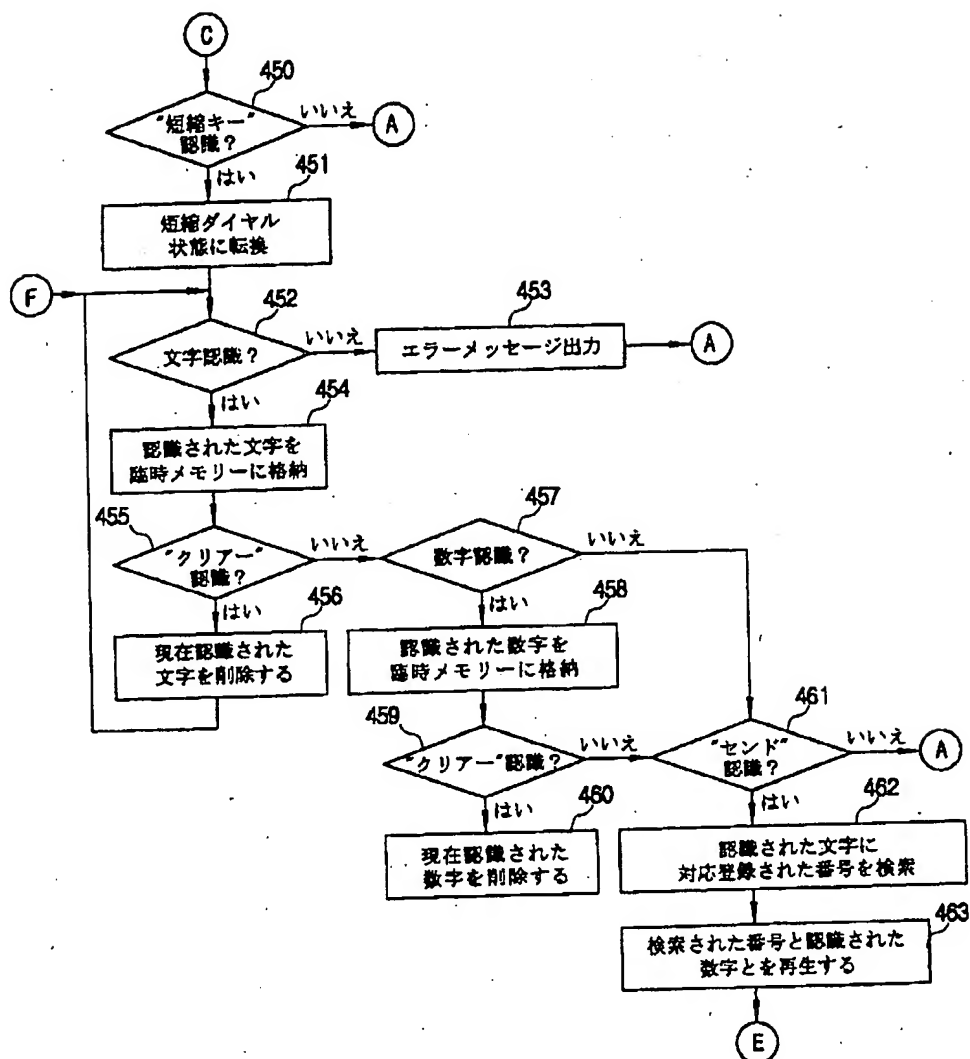
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]